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AUTHOR	Yang, Thomas Wei-Chi; Chaudhari, Ramesh
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ABSTRACT

This study examined the relationship between operating tax rates and selected socioeconomic variables for Illinois school districts. Districts were separately ranked by operating tax rates and then divided into four equal quartiles--low tax effort, low medium tax effort, high medium tax effort, and high tax effort. Discriminant analysis was used to construct a profile for each of these groups. Results of the study confirmed the general belief that differences in fiscal capacity and educational aspirations contributed to differences in local tax effort. The low tax effort group was characterized by a higher assessed valuation per ADA than the other groups. The high tax effort group was characterized by high education attainment, high percentage of professionals, high average income, high incidence of residential value, high density, and high urbanization. The high medium group was similar in some respects to the high tax effort group. The low medium tax effort group manifested lower educational attainment and a higher concentration of low income families, although its assessed valuation was close to that of the higher tax effort groups. (Author/JG)

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ABSTRACT

This study examined the relationship between operating tax rates and selected socioeconomic variables. The elementary, high school and unit districts were separately ranked by operating tax rates and were equally divided into the following four quartiles: low tax effort, low medium tax effort, high medium tax effort and high tax effort. Discriminant analysis was used to construct a profile for each of these groups.

The results of this study confirmed the general belief that differences in fiscal capacity and educational aspirations contributed to differences in local tax effort. The low tax effort group was characterized by a higher assessed valuation per ADA than were the other three groups. The high tax effort group, on the other hand, was characterized by high education attainment, high percentage of professionals, high average income, high incidence of residential value, high density and high urbanization. The high medium tax effort group was similar in some respects to the high tax effort group. However, the low medium tax effort group was unlike any other group. Although its average assessed valuation was close to that of the higher tax effort groups, the low medium tax effort group manifested lower education attainment and a higher concentration of low income families. This demonstrated the importance that income, population density, share of residential base, educational attainment and profession played in determining the local tax effort.

PREFACE

For over half a century, students of school finance have debated whether it was possible to provide "incentive" grants to local school districts and, at the same time, to use the fiscal system of the state to attain the long sought public policy goal of equalizing educational opportunity. Conventional wisdom has held that it was not possible to accomplish these two goals at the same time, as seen in this excerpt from the works of George D. Strayer and Robert Murray Haig in 1923:

> Any formula which attempts to accomplish the double purpose of equalizing resources and rewarding effort must contain elements which are mutually inconsistent. It would appear to be more rational to seek to achieve local adherence to proper educational standards by methods which do not tend to destroy the very uniformity of effort called for by the doctrine of equality of educational opportunity.

But school finance has always had its share of heretics to the "accepted faith," and a long line of scholars from Harlan Updegraff to the current proponents of "district power equalization" have believed that somehow the two goals of (a) stimulating local school districts to tax more and spend more, and (b) reducing disparity between school district expenditures, could somehow be reconciled. Thomas Wei-Chi Yang and Ramesh Chaudhari now add their contribution to this long debate. This is especially timely since the State of Illinois is currently engaged in a re-evaluation of the local incentive system that was passed in the summer of 1973. This research should add substantially to that policy re-evaluation.

Thomas Wei-Chi Yang is an Instructor in the Department of Educational Administration at Illinois State University and Assistant to the

Director of the Center for the Study of Educational Finance. Ramesh Chaudhari is Chief Scientific Programer at the Computer Services Division of Illinois State University. As is customary in all the publications of the Center, errors of fact or opinion are solely those of the authors and policy statements or conclusions contained herein do not necessarily reflect the position of the Center or of the University. Funds for this research were provided by the Illinois Office of Education. Data were provided by the Illinois Office of Education and the Sociology Department of Illinois State University. The federal census data used in this study were contributed by Dr. Vernon Pohlmann, Professor of Sociology and a Research Associate in the Center for the Study of Educational Finance. The policy conclusions expressed herein are those of the authors and must not be construed to be the official position of the Illinois Office of Education or of any other cooperating agency.

G. Alan Hickrod
Co-Director

Ben C. Hubbard
Co-Director

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CHAPTER I

INTRODUCTION

School districts in the State of Illinois exhibit widely varying local tax effort to support their educational program. In Illinois, the operational money available to schools is obtained from a large number of funds with independent taxing powers. Local districts have authority to levy, by action of the school board and/or by vote of the people, additional taxes so that the quality of education may be improved. The exercise of local independent taxing power is well established and commonly considered important in the maintenance of local control of education. However, this local taxing power has recently raised significant questions with regard to equalization of educational opportunity. Many educators and legislators feel that the level of district tax effort in support of public education is closely associated with the local social, economic, or political conditions. These conditions have sometimes worked to the disadvantage of worthwhile education. The citizens of some communities have, without due consideration to the consequences, deprived their own children of a good education.[1]

Most studies of reform, particularly in the State of Illinois, dealing with the problem of equity in educational opportunity have

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[1]Kern Alexander and K. Forbis Jordon, "Equitable State School Financing," in Educational Need in the Public Economy (Gainesville, Florida: The University of Florida Presses, 1976).

focused on fiscal neutrality as a measure of equity. There has not been much research published in the area of tax effort distribution. One problem contributing to this lack of publication in the past has been the lack of interest in the dispersion of district tax effort. Often there is concern that certain districts are being favored or short-changed, but seldom is there discussion of the impact of adopting certain funding programs on equal educational opportunity. A state funding system that is designed to offer incentive grants to school districts levying higher local taxes must address the problems created by wide variations in district tax effort. A child's education may be seriously impaired or restricted if local aspiration levels inhibit school district authorities from utilizing resources that are present in the tax base of the local school district.[2]

In addition to the local aspiration factor, the study will also call attention to some variables that are important in the process of local decision making with regard to tax effort. Not all locally-imposed taxes are truly local in nature. Some local taxes may be exported to other communities. The taxes on industrial and commercial business properties, for example, may be transferred outside the taxing jurisdiction through forward shifting to consumers and backward shifting to the non-resident suppliers. Local taxing power is increased in high commercial and business areas while it is reduced in low commercial and business areas because a large proportion of non-residential property would mean that voters' tax dollars would be supplemented by

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[2]Alexander and Jordan, "Equitable State School Financing."

the much larger contributions of commercial and industrial property owners.[3]

Local spending decisions on education could also be affected if the educational benefits are extended to an area larger than the decision-making local school district. This seems to be likely where local school districts cannot close their borders to the citizens of the other school districts. Such school districts have little control over the flow of education benefits beyond their boundaries. Where the local school district that makes decisions concerning spending on education services cannot completely internalize costs and benefits, it may underspend or overspend.[4]

If one or more factors, such as local aspiration, benefit spillover, or cost spillover, has a significant impact on local public school spending levels, then the adoption of a District Power Equalization system (providing local incentives while equalizing per-pupil district tax base) would not lead to substantial equality of educational opportunity. In such circumstances, the desirability of continuing to grant each local district independent education taxing power would be doubtful.

Thus, this study focuses on the relationship between selected socioeconomic characteristics of local school districts and tax effort and seeks answers to questions concerning the determinants of local

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[3]Arthur J. Alexander and Gail V. Bass, Schools, Taxes, and Voter Behavior: An Analysis of School District Property Tax Elections (Santa Monica, Calif.: Rand Corporation, 1974).

[4]Alan Williams, "The Optimal Provision of Public Goods in a System of Local Government," Journal of Political Economy 74 (February 1966), 18-33.

tax effort. Some questions that might be answered are as follows: Is local tax effort a positive (or negative) function of local wealth or fiscal ability? Do socioeconomic characteristics of the local school districts appear to influence the decision of the local tax effort? Can a generalized profile of tax effort in relation to socio-economic characteristics be developed from this study? The answers to these questions may provide a better understanding of the complex nature of local tax effort. From the results of the analysis, underlying factors affecting the determination of local tax effort may be identified. The identification of such factors could provide valuable information for improving the degree of equal educational opportunity among school districts.

CHAPTER II

RELATED LITERATURE

The study intended to examine the relationship between school district tax effort and selected socioeconomic variables. The purpose of this section is to review relevant literature and research that both focuses directly and exclusively upon school tax effort, and looks at local tax referenda for the educational fund in conjunction with other types of local referenda. The local tax effort generally is related to local fiscal ability and demand for public education. The selected literature and research in this section, therefore, are divided into two parts. The first examines factors affecting the local fiscal ability; the second examines factors affecting the local demand for education.

Factors Affecting the Local Fiscal Ability

Assessed Property Valuation Per Pupil

A measure of local district fiscal ability to support education normally includes real property values. From the standpoint of the taxing school district, assessed values are more important than are market values. Together with the tax rate, the district's ability to raise tax revenue is determined by local assessed values. For this reason, assessed values, instead of real values, is selected as a measure of local fiscal ability.

With a fixed amount of school budget, a school district with high assessed property valuation per pupil is able to generate relatively high revenues per pupil with a relatively low tax rate. A school district with a relatively low assessed valuation of real property per pupil is only able to generate relatively low revenues, even with a considerably higher tax rate. Thus, a negative relationship between assessed property valuation per pupil and tax rate would be expected.

Share of Residential Property

Many studies put their emphasis on the total property tax base per pupil and seldom give proper attention to the composition of the local property tax base that also influences local decisions to provide educational services. In general, the school tax base can be divided into local and non-local components. Not all locally-imposed taxes are truly local in nature. A school district with a high percentage of commercial and industrial property may exert a high tax rate simply because a small portion of taxes raised by residents of the local district would be compounded by the much larger contributions of commercial and industrial property owners in the district. This variable may be a measure of cost spillout. This cost spillout variable might be negatively correlated with the level of tax rate. The 1973 study of cost and benefit spillouts as factors affecting local taxation for public schools in West Virginia by Bowman clearly revealed that access to a tax base that enables voters to impose taxes for local use while exporting part of the burden outside the taxing jurisdiction was significantly and positively related to the level of local

taxes per pupil.[5]

Income

In many respects, income provides a better measure not only of capacity but also of the ability to pay the taxes that have been levied since the true capacity of a local district is determined by flow of resources as well as by the taxable resources available.[6] Many studies have indicated a positive relationship between income and the school tax referenda election outcome. Milstein and Jennings' study of success or failure on bond referenda in western New York during 1968-69 found that districts with a high percentage of low income families were more likely to perceive the school bill as excessive.[7] Gallup's study of adults' attitudes toward school referenda further supports Milstein and Jennings' finding that higher income people were more favorable toward school tax increases than were lower income people.[8]

Population Density

Because of the overlap of local school districts and local governmental units, both must look to the same tax base for their support. City government's expansion in utilizing local resources, for example, could

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[5]John H. Bowman, "Cost and Benefit Spillouts as Factors Affecting Local Taxation for Public Schools." An invited paper presented to NTA-TIA Outstanding Doctoral Dissertation Awards Program, National Tax Institute (September 12, 1973).

[6]Alexander and Jordan, "Equitable State School Financing."

[7]Mike M. Milstein and Robert E. Jennings, Factors Underlying Bond Referendum Successes and Failures in Selected Western New York School Districts: 1968-69 (Buffalo: Department of Educational Administration, State University of New York at Buffalo, 1970).

[8]George H. Gallup, "Fourth Gallup Poll of Public Attitude Toward Education," Phi Delta Kappan 54 (September 1972), 33-46.

affect the ability and willingness of citizens to support public school taxes. It is possible that an area with high expenditures for other government services would have less resources available for the support of public schools. The existence of such disparity between local fiscal ability and actual ability to raise revenue is labeled "municipal overburden."[9]

Since the data on other government taxes is not readily available, a proxy measure of municipal overburden could be utilized. Through the effect of population density the impact of municipal overburden on school support may be examined because of the close linkage of density to urban problems. Another proxy variable for municipal overburden is percentage of low income families. The predominance of low income families could indicate a high degree of fiscal inability.

Growth Rate of Assessed Property Valuation

Assessed property valuation is one measure of district fiscal ability. There is a relationship between the growth rate of district tax capacity and tax rate. Education is considered a normal good on the theory that demand for education is expected to increase as the district fiscal ability increases. A 1961 study of financing government in metropolitan areas by Sacks and Hellmuth included 32 school systems for the period 1950-58.[10] Hickrod and Sabulao revealed that changes in assessed valuation was the most significant single

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[9]John H. Bowman, "Cost and Benefit Spillouts as Factors Affecting Local Taxation for Public Schools" (Ph.D. dissertation, Ohio State University, 1973).

[10]Alan G. Hickrod and Cesar M. Sabulao, Increasing Social and Economic Inequalities Among Suburban Schools (Danville, Ill.: Interstate Printers and Publishers, 1969).

variable accounting for the variation of school expenditures.

Ratio of Local Revenue to Total Revenue

Local school districts receive large amounts of financial aid from state government. A state aid funding system that provides incentive grants (reward for effort) for school districts levying higher taxes tends to have some influence on local tax rate determinations. It is expected that such incentive schemes induce more local dollars to be spent for public education. A 1974 study of voter behavior on local taxes by Alexander and Bass revealed that this price-related variable was positively correlated with the school tax election outcome. However, the coefficient on this price-related variable exhibited considerable fluctuations in both absolute value and significance depending on the form of equations.[11]

Factors Affecting Demand for Education

Variables related to the fiscal ability of local school districts affect public demand for education, at least indirectly. The factors affecting the direct measure of the demand for education include presence of children, non-white population, educational attainment, urban residence, ratio of owner-occupied housing units to total units, occupation, and enrollment change. The assumption is that these variables capture the extent to which people view public education as important or unimportant because of the relationship of formal education to their work, to perceived paths of social mobility, to their lifestyles, or merely

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[11]Arthur J. Alexander and Gail V. Bass, Schools, Taxes, and Voter Behavior: An Analysis of School District Property Tax Elections, p. 32.

because they have no children in public schools and do not care to support the education of others.[12] Literature related to these factors is as follows.

Presence of Children

Both theoretical considerations and some previous empirical studies suggest that presence of children should have some impact on voter behavior. In a 1964 study of voter participation patterns in three Oregon school districts, Parnell found that a group of citizens having children in school was more likely to participate in school budget elections than non-parents.[13] Nelson, in studying the outcome of school bond elections in 1968, also found that parents who had children in school tended to approve school tax increases.[14]

Non-white Population

According to a number of previous empirical studies, the percentage of non-white population seems to be positively associated with tax referenda outcomes. A 1967 study of patterns of white and non-white school referenda participation and support by Masotti revealed that non-white citizens were less active participants in school financial elections. Of interest is that non-whites who participated in the voting, voted in favor of school tax increases.[15] Friedman also noted the

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[12]Norton W. Grubb and Stephan Michelson, States and Schools (Lexington, Mass.: D. C. Heath & Company, 1974), p. 95.

[13]Dale P. Parnell, "Voter Participation Patterns in Three Oregon School Districts" (Ed.D. dissertation, University of Oregon, 1964).

[14]Carl M. Nelson, Jr., "A Prediction Model for Determining the Outcome of School Bond Elections" (Ed.D. dissertation, University of Arkansas, 1968).

[15]Louis M. Masotti, "Patterns of White and Non-white School Referenda Participation and Support: Cleveland 1960-64," in Educating an Urban Population, ed. M. Gittell (Beverly Hills, Calif.: Sage, 1967), pp. 240-256.

existence of distinctive subcultural voting. Jewish and Negro populations were found to support virtually all referenda with a low level of turnout rate.[16]

Educational Attainment

It is frequently assumed that the higher an individual's educational level, the more likely he will appreciate the value of education. This assumption has been supported by numbers of empirical studies. McKelvey, in the study of voting behavior in two coterminous sytems of local government found that individuals who had at least some college education were more likely to vote in favor of these school tax elections than individuals with less education, regardless of their ranking on other dimensions.[17] In 1968, Boozer's study of the voting public in Grand Rapids, Michigan, also supported this finding.[18] Gallup reported that 50 percent of the college graduates polled favored tax increases for schools while only 27 percent of the people with only elementary educations approved.[19] However, negative relationships between educational attainment and the level of appreciation of the advantages of

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[16]Gordon D. Friedman, "Issues, Partisanship and Political Subcultures: A Study of Voting in Statewide Referenda in New Jersey, 1944-66" (Ph.D. dissertation, University of North Carolina at Chapel Hill, 1971).

[17]Troy V. McKelvey, "A Cooperative Study of Voting Behavior in Two Coterminous Systems of Local Government" (Ph.D. dissertation, University of California at Berkeley, 1966).

[18]Raymond L. Boozer, "A Study of the Voting Public in Grand Rapids, Michigan, to Provide the Basis for Planning and Conducting Future Public School Operating Millage Elections in That District" (Ph.D. dissertation, Michigan State University, 1969).

[19]George Gallup, "Fourth Annual Gallup Poll of Attitudes Toward Education," Phi Delta Kappan 54 (September 1972), 65-79.

education were present in the McMahan, Jordan, and Davison studies.[20] This negative relationship might suggest that persons with low levels of education might have high demand for education for their children so their children might have better lives through better education.

Urban Residence

The use of urban residence measures is in line with the assumption that persons residing in urban areas have more of a demand for education than residents of non-urban areas. Therefore, the rural or urban nature of the school district might have some influence on voting behavior. In a 1974 study based on more than 1,600 school district property tax elections held in California from the mid-1950s to 1972, Alexander and Bass found a positive correlation between percentage of urban population and election outcome, but this correlation was not significant.[21]

Ratio of Owner-occupied Housing Units to Total Units

This variable is intended to reflect the strength of the level of commitment that the property tax payers in the community exhibit. This variable primarily serves as a proxy variable of benefit spillout. Theoretically, owner-occupants are more attached to the community than renters. A high percentage of owner-occupants would indicate either

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[20]Stephen T. McMahan, "Demographic Characteristics and Voting Behavior in a Junior College Creation, Tax Levy and Bond Issue Election" (Ph.D. dissertation, University of Texas, 1966). Wilson K. Jordan, "An Analysis of the Relationship Between Social Characteristics and Educational Voting Patterns" (Ed.D. dissertation, University of California at Los Angeles, 1966). George W. Davison, "The Relationship of Selected Factors to the Success or Failure of School Tax Referenda" (Ed.D. dissertation, University of Illinois, 1967).

[21]Alexander and Bass, Schools, Taxes, and Voting Behavior: An Analysis of School District Property Tax Elections.

(1) strong attachment to the community or (2) high population stability. Both of these factors are expected to be positively associated with the tax rate level. In a 1974 study of 1970 school district property tax elections in California, Alexander and Bass examined the relationship of a large number of variables to election results.[22] The dependent variable was dichotomous, taking on the value of one if the tax referendum passed and zero if it failed. Alexander and Bass found that the coefficients of percentage of owner-occupied housing was positively related to the referendum outcome; however, the coefficient was not statistically significant.

Occupation

Occupation also tended to measure taste or demand for public education. Occupation has been found to have a strong relationship to education attainment. Since education theoretically and empirically was found to be positively associated with the high value of the advantage of education, occupation, therefore, is expected to have a relationship with education. Many studies have attempted to correlate voting outcomes with occupational status. Gallup, in his annual survey of attitudes toward education across the nation in 1969, found that individuals in business and professional occupations were more likely to vote than were individuals in other occupational categories.[23] Hamilton and Cohen, in their study of school referenda, also found that social status was highly related to percentage of favorable vote. They found that in

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[22]Ibid.

[23]George Gallup, How the Nation Views the Public Schools (Princeton, New Jersey: CEK/Ltd., Gallup International, 1969), pp. 79-80.

Ithaca and Corning, New York, persons employed in professional or managerial occupations were more supportive of education tax referenda than were persons employed in other occupations.[24]

Enrollment Change

The school district expenditure level is, to some degree, dependent upon the demand for education. A school district with a high percentage of declining enrollment is less likely to increase its tax rate than are increasing enrollment districts. This expectation presumably follows the assumption that the demand for education decreases as enrollment declines. In a 1965 study of voting behavior in referenda elections in Illinois, Johnson found that bond issues were approved at a higher ratio in school districts that had a rate of growth in average daily attendance above the median rate of growth for all school districts in the sample.[25]

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[24]Howard D. Hamilton and Sylvan H. Cohen, Policy Making by Plebiscite: School Referenda (Lexington, Mass.: D. C. Heath & Company, 1974).

[25]Lowell Merwin Johnson, "The Relationship of Selected Variables to the Outcome of Referenda in Unit Type School Districts in the State of Illinois" (Ed.D. dissertation, University of Illinois, 1965).

CHAPTER III

CONTEXT OF THE STUDY

Background

School districts in Illinois can be of three basic types: elementary, high school, or unified. In 1974-75 there were 476 elementary school districts, 134 high school districts, and 442 unified school districts. There is no legal relationship between elementary and high school districts. Frequently, their boundaries are not coterminous. A single high school district will frequently overlie all, or part of, many elementary districts. Unified districts normally provide a single administration for all elementary and secondary schools within their boundaries. Tax rates in a unified district will generally be higher than in either elementary or secondary districts. The main reason for giving attention to these structural differences is that property value per pupil and many other characteristics frequently depend upon the type of school district.

Maximum tax rates for general operating expense, a building fund, capital improvement, and some other specific purposes are also prescribed for each type of school district by statute in Illinois. Voter approval is required to exceed the limits, and such authorizations are of indefinite duration. Special levies may be imposed without referendum for a variety of purposes, such as building maintenance funds, retirement, working cash fund, junior college tuition, and special education.

A distinctive aspect of the Illinois tax system is "the back-door referendum." A "back-door referendum" describes the circumstances under which the public may force the school board to have a referendum on some action taken by the board. This is accomplished by a petition submitted by the appropriate number of persons. This applies to a number of tax rates which boards of education levy. Funds subject to the back-door referendum include bond issues for the working cash fund and the educational fund for dual school districts.

In 1973, Illinois amended its old foundation program. Districts under this amended funding system have the option of being reimbursed under several formulas. The major formula change provides reimbursement under the "resource equalizer" principle. A district's entitlement is based on three major factors--(1) the concentration of Title I eligible pupils, (2) the district's assessed property value, and (3) the district's operating tax rate. Under the "Resource Equalizer" formula, districts with operating tax rates for unit, elementary, and high school districts equal to or in excess of 3.00%, 1.95%, and 1.05%, respectively, have a state guaranteed foundation level of $1,260 per Title I Weighted Average Daily Attendance.[26] If districts under this plan have operating tax rates in excess of the maximum rates specified for each type of district (3.00 for unit, 1.05 for high school, 1.95 for elementary district), such districts must reduce their tax rate gradually or proportionately to the share received of the state aid entitlement during the following consecutive three year period. The operating tax rate for these "roll-back districts," however, can be maintained at a level not to exceed a

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[26]State Board of Education, Illinois Office of Education, State, Local, and Federal Financing for Illinois Public Schools in 1975-76 (Springfield, Ill.: Illinois Office of Education), pp. 5-7.

certain limit as defined by statute.[27]

Because of the complicated structure of formula funding systems, and differences of geographic and demographic nature among unit, high, and elementary school districts, the analysis of data was made for each type of district. The results, however, were reported in a consistent form.

Research Approach

For the purpose of finding the tax effort structure characterized in terms of socioeconomic variables of school districts in the State of Illinois, the operating tax rate, that is the tax rate exerted by local school districts for basic educational fund or funds, was employed as a measure of tax effort. School districts were ranked in ascending order according to the level of the tax rate, and then were evenly divided into four groups--low, low medium, high medium, and high tax rate group. The purpose of this categorization was to determine if a profile of the nature of local tax effort existed. This profile then provides insight into the nature of tax effort and, consequently, helps identify some of the determinants of high and low effort. Low tax rate groups were as follows: 0.564-1.345 elementary; 0.983-1.275 secondary; 1.128-2.116 unified. Low medium tax rate groups were as follows: 1.348-1.627 elementary; 1.286-1.456 secondary; 2.117-2.301 unified. High medium tax rate groups were as follows: 1.627-1.928 elementary; 1.464-1.704 secondary; 2.302-2.600

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[27]These provisions were operative in FY 75 and FY 76. The "roll-back" requirement has been eliminated and the maximum operating tax rate under the "Resource Equalizer" formula for FY 77 was changed from 3.00% to 2.90% for unit districts, and from 1.95% to 1.90% for elementary districts.

unified. The high tax rate groups were as follows: 1.931-3.336 elementary; 1.705-2.441 secondary; 2.603-3.605 unified. These tax rate ranges were used throughout the study.

Multiple discriminant analysis was used for the exploration of the structure of tax effort. The distinguishing feature of the multiple discriminant analysis is to provide a geometric model of the similarities and differences among groups in a reduced measurement space. Groups can be located with respect to the reference vectors.[28]

Variables Used in the Study

Seventeen socioeconomic variables were used in the multiple discriminant analysis. Each was selected because it had been shown to be of some significance in previous studies or because, theoretically, it was expected to be related to tax effort in some way. Following are the descriptions of the 17 selected socioeconomic variables:

1.	Income, less than $5,000	: percent of population with annual income less than $5,000.
2.	Income, greater than $25,000	: percent of population with annual income greater than $25,000.
3.	Average income	: average income per capita
4.	Education, college	: percent of population 25 years old or over with four or more years of college education.
5.	Education, elementary	: percent of population 25 years old or over with education less than elementary level.

[28]John E. Overall and C. James Klett, Applied Multivariate Analysis (New York: McGraw-Hill Book Company, 1972), pp. 243-275.

6. Occupation, Professional & managerial : percent of employed persons in professional and managerial occupation

7. Occupation, blue collar : percent of employed persons in operatives, transport equipment operatives and laborers (except farm).

8. Non-white : percent of nonwhite in membership.

9. Children : percent of population age 6 to 18.

10. Urban living : percent of population living in urban area.

11. Owner-occupied housing : ratio of owner-occupied housing units to total units.

12. Population density : number of people per square mile.

13. Assessed property Valuation per ADA (AV per ADA) : ratio of equalized assessed property value to average daily attendance in 1973.

14. Assessed Valuation Growth Rate (AV growth rate) : ratio of 1974 equalized assessed valuation to 1972 minus one.

15. Residential housing : ratio of aggregate value of owner-occupied housing value to four times the equalized assessed value.

16. Enrollment Growth : ratio of 1974 enrollment to 1972, minus one.

17. Price : ratio of local revenue to total in 1974.

Data Resources

Data for variables one to twelve and the residential housing value were obtained from the 1970 census. Data for variables thirteen to seventeen, plus school operating tax rates for 1974, were provided by Illinois Office of Education. For the 1975 operating tax rate, it should be noted that since it was not available at the time the study

was in process, the 1974 tax rate plus tax referendum data for educational fund after 1974 was used to approximate the 1975 operating tax rate.

Study Population

The initial population was the 1,052 school districts in Illinois as of 1974-75 (476 elementary, 134 high, 442 unit). Since some missing values were found in residential housing data and some school districts were not identified because of consolidations after July 1, 1974, the study was restricted to the population of 430 elementary, 127 high, and 381 unit school districts.

Limitations

The study attempted to relate the results to characteristics of the school districts and of their tax efforts. Since the data were aggregated by school districts, the results of this study could not be used to draw any conclusions about individual behavior, but must be confined to statements about the specific aggregate characteristics of these school districts. It is not appropriate to say, for example, that high education individuals vote for higher school taxes, but rather that school districts with greater percent of populations of high education attainment have a greater probability of exerting higher tax rates.

CHAPTER IV

THE RESULTS

Unit School Districts

Three hundred and eighty-one unified school districts were studied. Table A shows the coefficients for the three discriminant functions obtained in the multivariate discriminant analysis. Bartlett's V statistic was used to determine the significance of overall group differences. It was found that the total discriminable variance of 125 was distributed as chi square with 51 degrees of freedom, indicating at least one significant function among the three functions of the table. To test the significance of each individual discriminant function, the successive Chi Square tests of Bartlett's V statistic were applied. The results of the tests indicated that the first two discriminant functions were significant, while the third function appeared to provide little additional group discrimination.

To test whether this discriminant procedure is significantly better than a purely random partitioning of the measurement space, the classification matrix for 17 variates, which provides a convenient method of summarizing the number of correct and incorrect classifications made by the discrimination procedure, was used. A Chi Square test found the differences between the means among the four groups to be significant at the .01 critical level. Thus, the discrimination procedure satisfactorily separated the low and high tax effort districts.

TABLE A

MULTIPLE DISCRIMINANT COEFFICIENTS
FOR UNIT SCHOOL DISTRICTS

	Func 1	Func 2	Func 3
Income, greater than $25,000....	2.13	-9.96	3.05
Income, less than $5,000.....	0.17	+8.30	-4.25
Education, college.....	12.17	+14.56	3.91
Education, elementary.....	-0.24	+5.55	6.32
Occupation, professional.....	-3.82	-4.79	-2.38
Occupation, blue collar.....	6.82	+0.68	-2.14
Average income.....	0.00	+0.00	-0.00
Non-white.....	1.56	-0.09	-4.72
Children.....	-5.93	+37.57	-27.31
Urban living.....	-0.35	-0.00	-0.26
Owner occupied housing.....	0.67	-2.38	-4.20
AV per ADA.....	-0.09	+0.60	0.02
Residential housing.....	0.01	+0.06	0.02
Density.....	0.08	+0.01	0.23
Enrollment change.....	-0.05	+0.01	0.04
AV growth.....	-0.03	-0.03	-0.04
Price.....	0.03	+0.02	-0.00

Bartlett's V Statistic = 125 Significant at 0.01 level
Degree of Freedom = 51

From the classification matrix for the 17 variates, a normalized classification matrix is presented as Table B. The elements of the normalized classification matrix are fractions of correct and incorrect classifications, which are derived from the raw misclassification counts obtained by dividing each by its row total. The normalized classification matrix provides some indication of the similarities and differences among the four groups. Districts in the low tax effort group have strongly differentiated characteristics, as indicated by the 50.5 percent on its diagonal. They are somewhat different from the districts in the high tax effort group and, to a lesser extent, are different

from those of the other tax effort categories, as indicated by the correspondingly "off diagonal" elements. Districts in the high medium tax effort group appear to be similar to districts in the low medium tax effort group; its diagonal element of 41% is only two times as large as its "off diagonal" element of 20% with respect to low medium group. However, this relationship between the high medium tax effort group and the low medium group is not reciprocal; the diagonal element of 51% with respect to low medium tax effort group is almost four times as large as the "off diagonal" element of 14.6% of misclassification to the high medium tax effort group.

TABLE B

NORMALIZED CLASSIFICATION MATRIX FOR UNIT SCHOOL DISTRICTS

		Predicted Group Membership			
Actual Group	Number of Cases	Group 1 Low Tax Effort	Group 2 Low Medium Tax Effort	Group 3 High Medium Tax Effort	Group 4 High Tax Effort
GROUP 1 Low Tax Effort	95	50.5%	17.9%	24.2%	7.4%
GROUP 2 Low Medium Tax Effort	96	17.7%	53.1%	14.6%	14.6%
GROUP 3 High Medium Tax Effort	95	16.8%	21.1%	43.2%	18.9%
GROUP 4 High Tax Effort	95	13.7%	22.1%	21.1%	43.2%

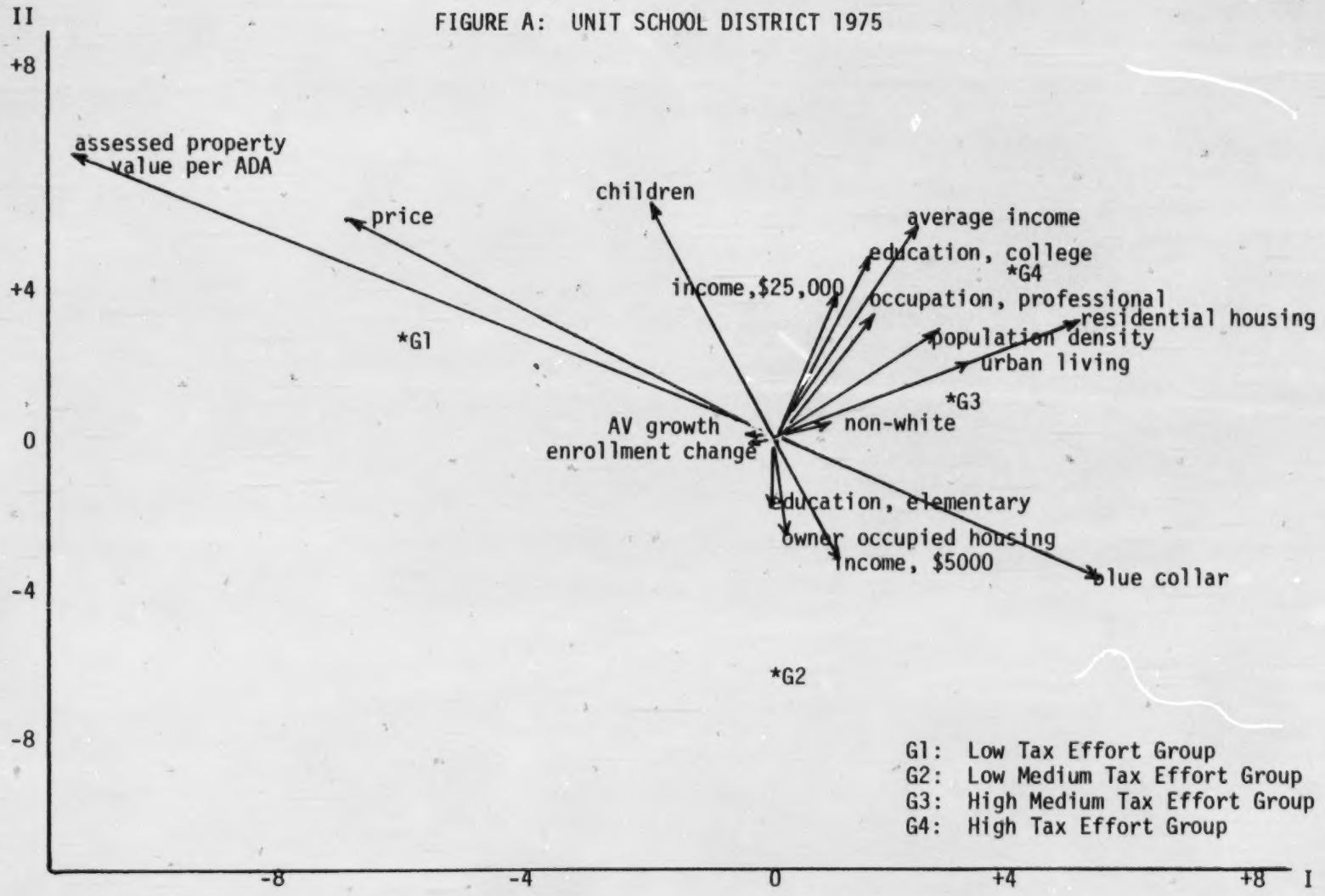
Percent of grouped cases correctly classified 47.5%
Chi Square = 102.93

Like the other three groups, the high tax effort group has a fairly distinct profile; it tends to be disproportionately associated with both the low medium tax effort group and the high medium tax effort group rather than with the low tax effort group. The relationship between the high tax effort group and the low medium tax effort group appears to be less reciprocal than does that between the high medium tax effort group and the high

Some evidence of the similarities and differences among groups has been shown in the normalized classification matrix. Certain prominent socioeconomic characteristics related to each tax effort group can be observed by inserting variable vectors into the configuration of tax effort groups, so that they tend to point toward the groups having the highest mean levels, and away from the groups having the lowest mean levels. The length of the variable vector is determined by multiplying the simple "between-groups" correlations by the ratio of between-groups variance to "within-groups" variance for the particular socioeconomic variable. The length of the variable vector can be used to represent its potency as a discriminator among the groups.

Figure A shows the profile of tax effort groups in unit school districts with socioeconomic variable vectors projected into the model. The picture indicates that the low tax effort groups differed from the other groups (particularly the high tax effort group) by having relatively high assessed property valuations and high price level. The high tax effort group tends to have a relatively higher percentage of people with income over $25,000, higher percentage of people living in urban areas, higher percentage of people with four years or more college education, higher percentage of people in professional and managerial occupations, higher average income per capita, higher percentage of residential housing value, and higher population density. Conversely, the low medium tax effort group appears to have a high percentage of people with education less than elementary level and a high percentage of people with income less than $5,000. In examining the difference of average assessed property valuation per ADA, it was found that the mean level of assessed property valuation for the low medium tax effort group

FIGURE A: UNIT SCHOOL DISTRICT 1975



was little different from that of high tax effort group.

Thus, it is evident that factors associated with education attainment, occupational status, and per capita income tend to be the major discriminators of local tax effort.

High School District

One hundred twenty-seven high school districts were included in the study. Table C reports the structure for the three discriminant functions among which two discriminant functions were revealed to be significant by the results of the successive Chi Square tests of Bartlett's V statistic. They accounted for .87 discriminable variance.

TABLE C

MULTIPLE DISCRIMINANT COEFFICIENTS
FOR HIGH SCHOOL DISTRICTS

	Func 1	Func 2	Func 3
Income, greater than $25,000..	-0.03	+4.29	-1.86
Income, less than $5,000.....	4.03	-2.77	-1.11
Education, college.....	1.22	-2.85	23.03
Education, elementary.....	-2.77	+0.71	6.93
Occupation, professional.....	3.68	-8.29	-33.01
Occupation, blue collar.....	0.88	-10.11	-4.00
Average income.....	-0.00	-0.00	-0.00
Non-white.....	-0.33	+3.06	-2.32
Children.....	-2.03	-0.83	23.49
Urban living.....	-0.92	-0.82	2.52
Owner occupied housing.....	2.95	-1.88	-3.12
AV per ADA.....	-0.01	+0.01	0.00
Residential housing.....	0.04	+0.02	0.00
Density.....	0.20	+0.05	-0.08
Enrollment change.....	0.00	-0.03	-0.01
AV growth.....	-0.00	+0.06	0.04
Price.....	0.04	-0.01	-0.02

Bartlett's V Statistic = 135 Significant at 0.01 level
Degree of Freedom = 51

The accuracy with which the school districts could be classified as belonging to either of the criterion groups was also tested by Chi Square to determine if the proportion of correct and incorrect classifications were significantly different from those expected if only chance factors were operating. The results of the test of the precision of classification are presented in Table D. The Chi Square value of 93.75 is significant beyond the .01 level, indicating that the classification provided by the discriminant function was highly accurate.

TABLE D

NORMALIZED CLASSIFICATION MATRIX FOR HIGH SCHOOL DISTRICTS

Actual Group	Number of Cases	Predicted Group Membership: Group 1 Low Tax Effort	Group 2 Low Medium Tax Effort	Group 3 High Medium Tax Effort	Group 4 High Tax Effort
GROUP 1 Low Tax Effort	32	59.4%	31.3%	6.3%	3.1%
GROUP 2 Low Medium Tax Effort	32	12.5%	71.9%	12.5%	3.1%
GROUP 3 High Medium Tax Effort	32	3.1%	25.0%	50.0%	21.9%
GROUP 4 High Tax Effort	31	12.9%	6.5%	12.9%	67.7%

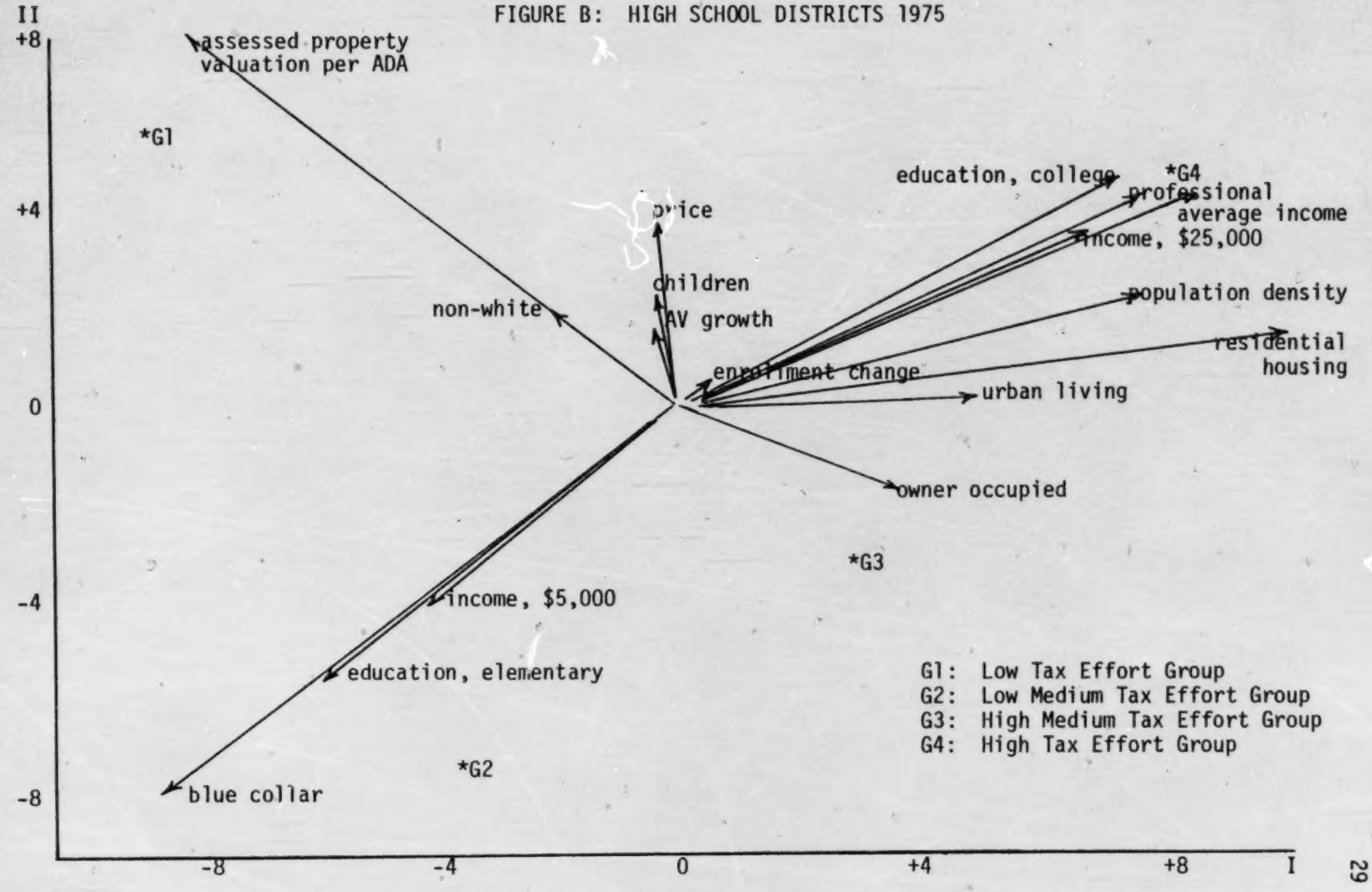
Percent of grouped cases correctly classified 62.2%
Chi Square = 93.75, significant at 0.01 level

A normalized classification matrix can be formed in the same manner as described in the unit school district section. From the normalized classification matrix shown in Table B, all tax effort groups have fairly distinct socioeconomic profiles, as indicated by the values on the diagonal; the low tax effort group are similar to the low medium tax effort group, while the high medium tax effort group seems to be somewhat associated with the low medium tax effort group; the relationships between these three groups, however, are not reciprocal. That is, if districts of one group tend to be misclassified in a second group, districts of the second group are, in turn, likely to be misassigned to the first group. The low tax effort group is strongly differentiated from the high tax effort group; its corresponding value on its off-diagonal is 3.1 percent.

This remarkable differentiation among groups resulted from the classification analysis,which suggested that the socioeconomic profile could be distinctly identified and that this profile could be discriminated effectively among the four tax effort groups. As noted, only two discriminant functions are significant. Differences between the tax effort groups can then be represented in a two dimensional configuration. The four group centroids and socioeconomic variable vectors were plotted on a two-dimensional space and are displayed in Figure B.

The configuration, with a socioeconomic characteristics vector projected into the model for high school districts, identifies the fairly distinct characteristics associated with each tax effort group. The low tax effort group differed substantially from the other groups by having a relatively high level of assessed property valuation. Average assessed valuation per ADA was computed for each group.

FIGURE B: HIGH SCHOOL DISTRICTS 1975



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They were $102,804 for low tax effort group, $62,829 for low medium tax effort group, $69,375 for high medium tax effort group, and $64,122 for high tax effort group. It was expected that low tax effort was inversely correlated with high property assessed valuation. Of surprise is that the mean level of property valuation per ADA in the low medium tax effort group is little different from that of the high tax effort group. By inspecting the socioeconomic variable vectors in Figure B, characteristics related to education attainment, income level, occupational status, residential housing, and urban living appear to be of considerable importance in determining the amount of local tax effort.

The configuration presented in Figure B also reveals a strong relationship between tax effort and the percentage of owner-occupied houses, as an indirect measure of benefit spillover, in the high medium tax effort group. This implies that if educational benefits spillover are large, an increase in educational expenditures necessitating a rise in property taxes would be met with considerable resistance from local residents.

Elementary School Districts

Four hundred thirty elementary school districts were studied. The coefficients for the three discriminant functions for elementary districts are presented in Table E. To test the significance of overall discriminations among the groups, Bartlett's V Statistic distributed as Chi Square was applied. The Chi Square value of 335 for the 51 degrees of freedom is significant beyond the 0.01 critical level, suggesting that there exists at least one significant function among the three. The results of successive tests of Chi Square revealed that

the first two discriminant functions were found to be significant. The third discriminant function also appears to provide some additional group discrimination; however, since it accounts for less than six percent of the sum of all three roots, differences between the tax effort groups can be explained by the first two discriminant functions.

TABLE E

MULTIPLE DISCRIMINANT COEFFICIENTS
FOR ELEMENTARY SCHOOL DISTRICTS

	Func 1	Func 2	Func 3
Income, greater than $25,000....	-1.83	7.20	-6.51
Income, less than $5,000.....	-0.26	-3.48	2.19
Education, college.....	4.73	5.06	-2.10
Education, elementary.....	-2.00	3.48	0.15
Occupation, professional.....	-2.14	-6.15	16.07
Occupation, blue collar.....	0.64	-7.04	5.95
Average income.....	0.00	-0.00	-0.00
Non-white.....	2.03	1.50	6.44
Children.....	-0.66	0.65	1.17
Urban living.....	0.11	-0.81	-1.09
Owner occupied housing.....	0.20	2.49	5.11
AV per ADA.....	-0.00	0.01	-0.00
Residential housing.....	0.02	0.00	0.02
Density.....	0.08	0.11	0.11
Enrollment change.....	0.00	-0.00	-0.00
AV growth.....	-0.00	0.00	0.00
Price.....	0.00	0.00	0.04
Bartlett's V Statistic = 335	Significant at 0.01 level		
Degree of Freedom = 51			

The test of the precision of classification was applied. The results of the precision test are reported in Table F. The Chi Square value of 40.45 is significant beyond the 0.01 significance level, indicating that this function accurately separates the four tax effort groups.

TABLE F

NORMALIZED CLASSIFICATION MATRIX FOR ELEMENTARY SCHOOL DISTRICTS

Actual Group	Number of Cases	Predicted Group Membership: Group 1 Low Tax Effort	Group 2 Low Medium Tax Effort	Group 3 High Medium Tax Effort	Group 4 High Tax Effort
GROUP 1 Low Tax Effort	107	70.1%	22.4%	7.5%	0.0%
GROUP 2 Low Medium Tax Effort	108	21.3%	46.3%	24.1%	8.3%
GROUP 3 High Medium Tax Effort	108	13.9%	26.9%	34.3%	25.0%
GROUP 4 High Tax Effort	107	5.6%	14.0%	17.8%	62.6%

Percent of grouped cases correctly classified 53.2%
Chi Square = 40.45, significant at 0.01 level

A normalized classification matrix in which the diagonal elements denote the percentage of correct classifications and the off-diagonal elements denote the percentage of incorrect classification can be developed and therefore reported in Table F.

The low tax effort group and the high tax effort group have strongly differentiated profiles; the diagonal element corresponding to these two groups are 70.1% and 62.6%, respectively, and the off-diagonal indicates that misclassification percentages are zero percent and 5.6 percent. The low medium tax effort group has a fairly distinct profile, and is most similar to the low tax effort group, followed by

the high medium group. The high medium tax effort group appears to be less differentiated, particularly from the low medium tax effort group and the high tax effort group; its diagonal element of 34 percent is less than 1.5 times as large as the misclassification in the low medium and the high tax effort groups.

Inspection of Table F suggests that certain socioeconomic characteristics are found to be most clearly associated with each individual tax effort group. Figure C presents the two-dimensional configuration with four centroids and socioeconomic variables plotted into the space. The axes are corresponding to the most significant discriminant functions. Figure C demonstrates that the low tax effort group differs substantially from all of the other groups in that it has relatively high property assessed valuation per ADA. The mean levels of average assessed valuation per ADA were computed for each tax effort group. The low tax effort group appears to have the highest average assessed value of $38,231, followed by the high medium tax effort group of $36,741; the high tax effort group $33,957, and finally the low medium tax effort group has $33,152. As was expected a priori, the inverse relationship between the tax effort and property assessed valuation was found in both the low tax effort group and in the high tax effort group. The attention, however, should be focused on the differences between the high tax effort group and the low medium tax effort group when they have almost the same size of property valuation per ADA. The socioeconomic variable vectors indicate that the difference between these two groups seems to be evident. The separation of the low medium tax effort group and the high tax effort group was mainly due to the differences in education attainment, income level, occupation status, residential

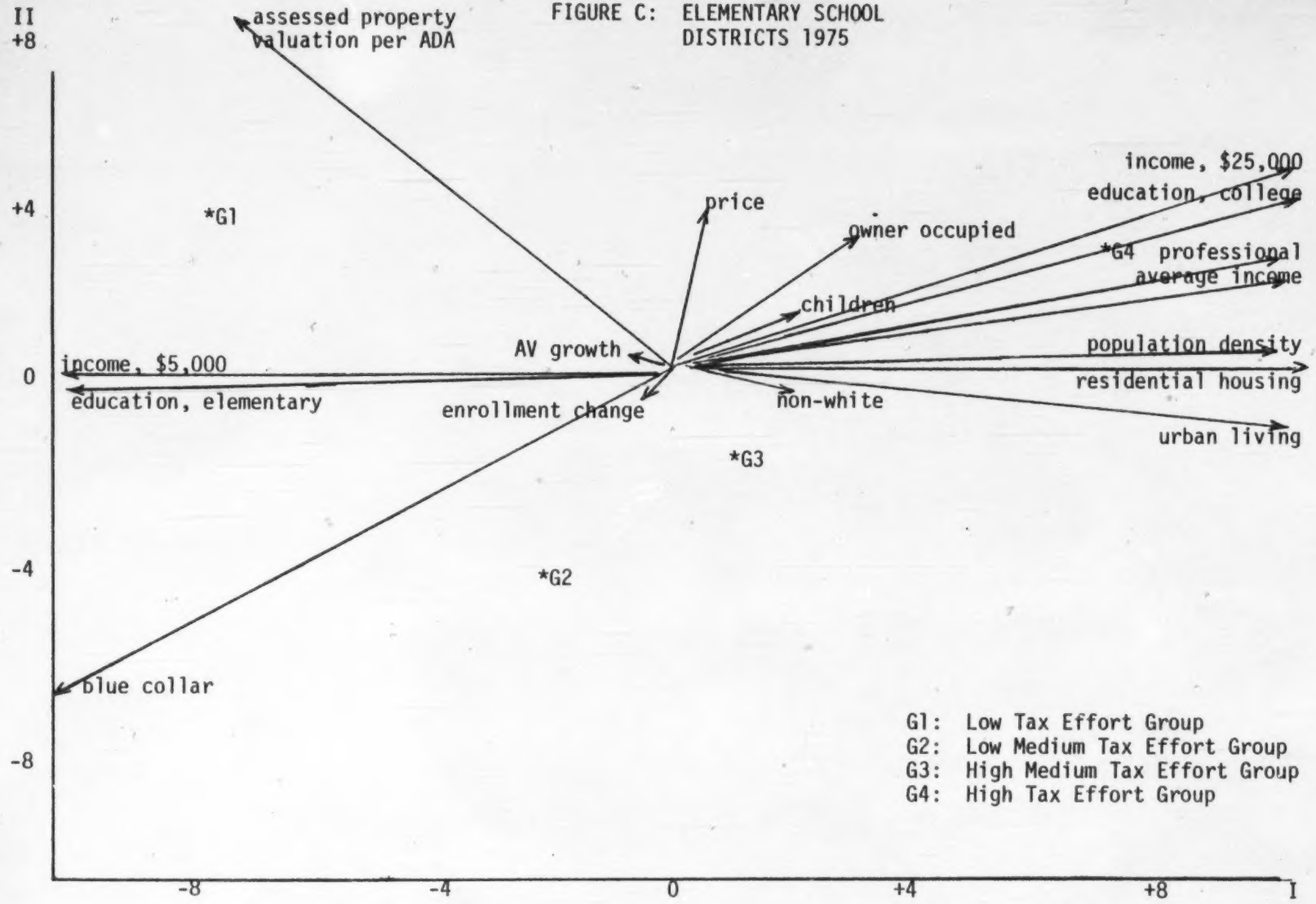

FIGURE C: ELEMENTARY SCHOOL DISTRICTS 1975

housing, population density, and owner occupied housing. The factors affecting the districts' ability and demand for education seem to play an important role in determining the amount of local tax effort.

CHAPTER V

SUMMARY AND POLICY IMPLICATIONS

It is evident from this study of tax effort in relation to seventeen selected socioeconomic variables that a generalized profile of the nature of tax effort can be developed for all types of school districts by taking only the most consistently prominent variables into account. Before describing the profile, it should be stressed that, in each case, the prominence of a socioeconomic factor is represented relative to the prominence of that same factor in other groups, and not relative to the prominence of other socioeconomic factors in the same group. For example, educational attainment may be very prominent in all tax effort group profiles. It, however, appears as a distinct characteristic in the high tax effort group because the prominence of this variable is relatively great in the high tax effort group as compared with the other groups. This does not mean that the high tax effort group should be characterized as having higher levels of education attainment than it does of the other socioeconomic characteristics. Table G presents the profile containing only the most consistently prominent variables particularly associated with a tax effort group as compared with the other groups.

The generalized profile in Table G demonstrates an important relationship between tax effort and the factors that are related to the social and economic conditions of local school districts. That the differences in the level of fiscal capacity and local aspiration among school districts

contribute to differences in local tax effort was generally confirmed by the research. The low tax effort group differed substantially from the other groups in that it had a relatively high level of assessed property valuation per ADA. Conversely, the average assessed property valuations per ADA in all of the other groups (in all three types of districts) were relatively low compared with that of the low tax effort group, and were surprisingly similar to each other. The profile shows that the high tax effort group tends to have high education attainment, high occupation status, high average income, high residential housing value, and high population density. The low medium tax group, while having almost an equal amount of tax base as does the high tax group, tends to have relatively low educational attainment and a high concentration of families at the low income level. While this profile was applicable for all types of school districts, the normalized classification tables show that it was especially appropriate for dual school districts. Thus, variables related to fiscal capacity are of considerable importance in local spending decisions related to public education.

TABLE G

A GENERALIZED PROFILE

Low	Low Medium	High Medium	High
High Assessed Valuation of Property per ADA	Low Education Attainment Low Income	Urban Living	High Education Attainment High Occupation Status High Income High Residential Housing Value Population Density

As noted, residential housing value should be inversely correlated to local tax effort. Since local revenues are raised largely through property taxes, an increase in expenditures requiring a rise in property taxes would be expected to meet with considerable resistance from local residents. Contrary to what was expected a priori, high residential housing value areas consistently, in all types of districts, tended to tax themselves proportionately more than did low residential districts. A possible explanation may be that tax effort was positively correlated with per capita income, education attainment, and occupational status. This implies that residential housing may also serve as a proxy for the personal wealth or permanent income. A positive correlation existed between tax effort and residential housing value. A possible reason for this might be that its income effect was greater than its price effect. That is, the effect on tax effort through its partial correlation with family income across districts could be larger than the effect of its being a price variable on local tax effort.

Population density was expected to be negatively correlated with tax effort. The presence of its positive association with tax effort may indicate that it might be acting as a necessity factor, rather than as a proxy measure of municipal overburden. That is, population density may serve as an index of the range of special interests and the need for diverse educational programs which should be met by offering a relatively complicated package of educational services to benefit all types of students, whether career or vocational in orientation. This complex package of programs tends to generate support from a wider range of parents and taxpayers.

The study generally indicated that the degree of tax effort for education was rather closely dependent on social and economic conditions which tend to place the higher social and economic level districts in a favored position. That is, districts with high income level, high occupation status, high education attainment, high population density, and high residential housing value tended to tax themselves relatively higher than their counterpart districts. So, a state funding system permitting optional local tax effort while also providing incentive grants to the districts who help themselves by raising high taxes for education must address the problems of wide variations in school expenditures created by variations in tax effort.

An adoption of a simple tax base equalization formula would be an inadequate remedy for existing variations in school expenditures because of wide variations in tax effort. The most advantageous approach to the solution of this dilemma is to implement a full state funding system so that inter-district differences in fiscal ability, local demand for education, and other determinants of educational taxation could be neutralized. Under this approach, tax rates would be equalized at the state level. The possibility of unequal education opportunity would thus be diminished. However, full state funding is not without drawbacks. One of the primary costs of this approach would be loss of local control. Local residents cannot exercise discretionary financial control over their public schools. In order to preserve the essence of local promotion of some innovative or experimental programs, a local incentive system may be added to the full state funding approach. Small variations could then be created and limited by this added feature.

Recognizing the political and financial restrictions and implications of full state funding with its attendant reduction in local control of school finances, partial solutions which result in more equalization of educational opportunity among the school districts should be considered. Analysis of the two-dimensional configuration figure generated by this study indicates the difference in socioeconomic characteristics particularly between the low/medium tax effort group and the high/medium tax effort group. Including in the present school aid formula the variables found to be important in this study, given in the configuration, should help to improve equalization among school districts. An income variable may be introduced in the present formula as a measure of the ability to expend funds for education. Extensive research and numerous simulations would be required to construct an exact formula that would meet the political and economic constraints of the state government while alleviating the problem of disparate expenditures for education created by the current system with its wide variation in tax effort. This may be a realistic compromise for policy makers attempting to balance the seemingly conflicting ideals of equal opportunity and local control.